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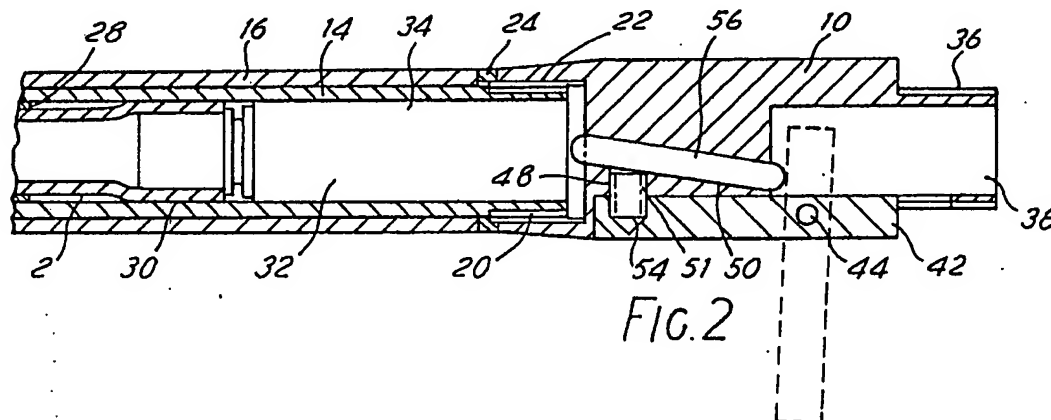
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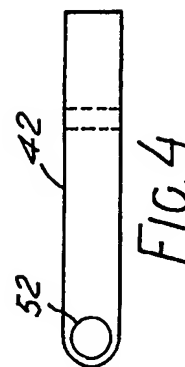
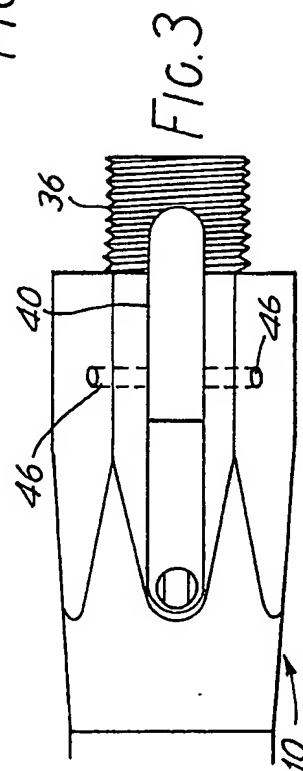
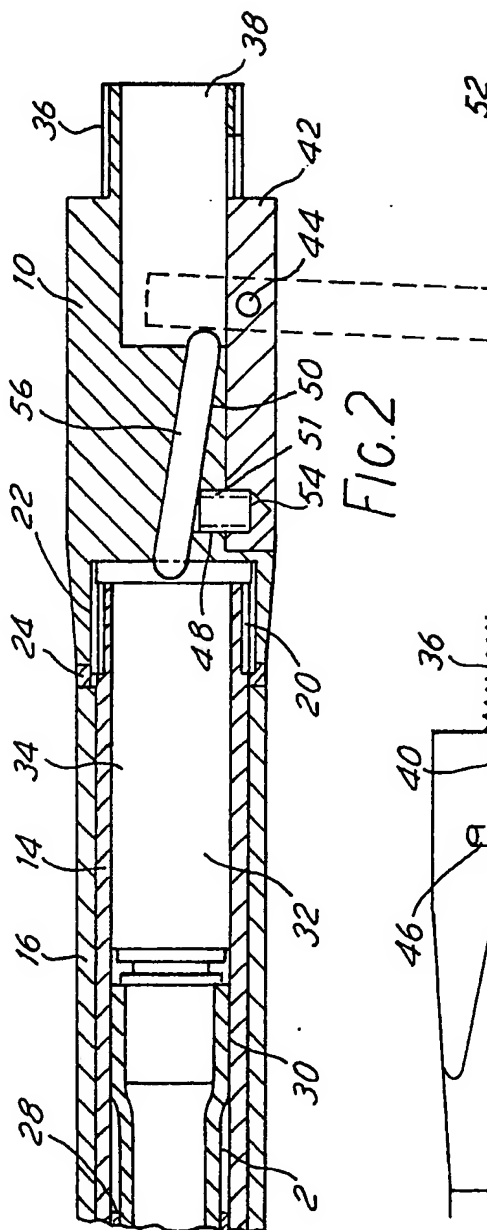
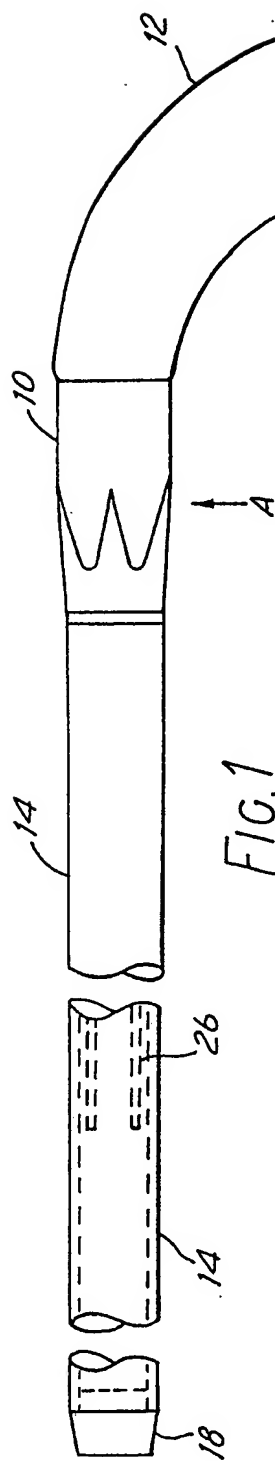
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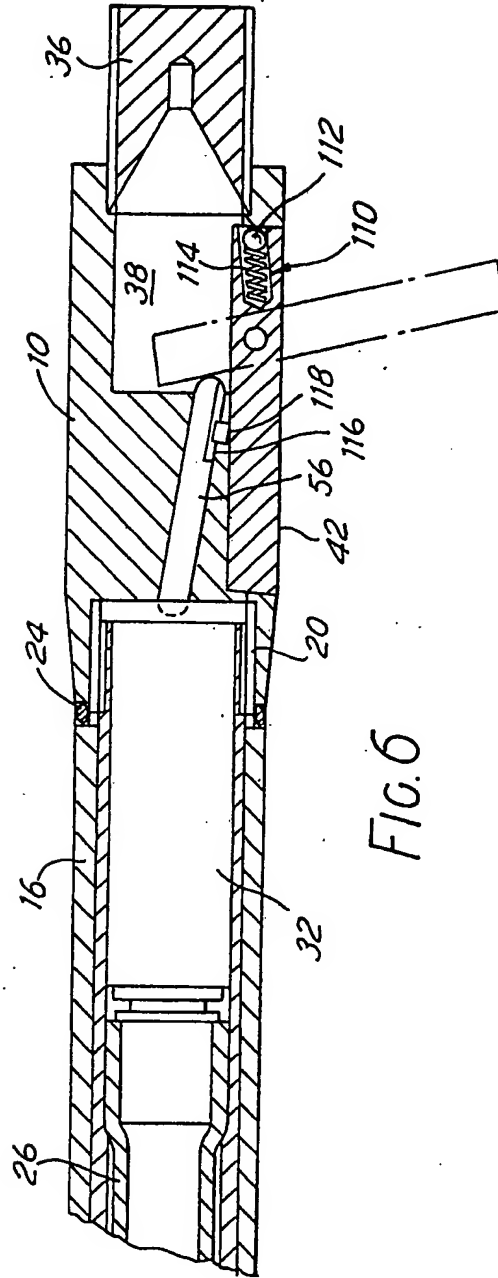
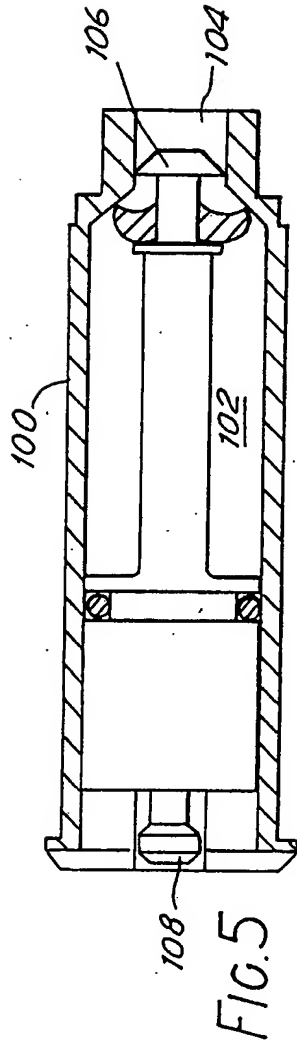
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## (54) Air guns

(57) A low muzzle energy air gun adapted to receive a known compressed air cartridge has in place of the conventional dual action trigger assembly, a freely pivoted trigger lever 42 which can readily be retracted to a transport position. When in this position the lever 42 is held by locking means, eg. magnets 51, 54, or a spring biased detent (112, 114, Fig. 6). Finger pressure applied to the rear end of lever 42 causes it to be released and engage one end of a firing pin 56, whereupon finger pressure is now applied to the opposite end of the lever 42 to move pin 56 along a channel 50 and so engage the firing element of the air cartridge 32. The air gun is shown (Fig. 1) disguised as a walking cane.







## SPECIFICATION

## Air guns

5 This invention relates to low muzzle energy air guns such as air rifles or pistols.

In order to enable conventional rifles, or more usually replicas of conventional rifles, to be used as air rifles, there have been produced air cartridges which fit in the breech of the rifle in place of a conventional explosive cartridge. The air cartridge is pre-charged with compressed air and then loaded with a small pellet. The air cartridge has a firing pin which is adapted to be struck by the rifle trigger assembly in the same manner as a detonator pin. Movement of the firing pin causes a valve to open causing the pellet to be expelled under the action of the expanding air. The trigger assembly takes of course the conventional form in which a first movement cocks the assembly and a second movement releases the mechanism.

In addition to its uses with replica guns, this type of air cartridge would offer advantages if used in a specifically designed air rifle. There would be no need, for example, to provide for an air compression mechanism in the rifle itself, thus leading to a lighter and mechanically less complicated mechanism. It will be understood that with such a specifically designed air gun, the provision of a cockable trigger assembly is no longer dictated by the desire for faithful reproduction of an original. Indeed, need for such a trigger assembly may represent a design constraint where it is the very object of mechanical simplicity that has led to choice of the air cartridge.

It is an object of this invention to provide an improved low muzzle energy air gun operable with pre-charged air cartridges. It is a further object to provide such an air gun which is mechanically less complicated. It is a still further object of one form of this invention to provide such an air gun which is of disguised appearance.

Accordingly, the present invention consists in a low muzzle energy air gun comprising a cartridge chamber for receiving a preloaded cartridge with a projectile, a compressed air charge and a firing element displaceable to initiate expulsion of the projectile under the action of the expanding air; a projectile bore communicating with the cartridge chamber and a trigger assembly actuable to displace the cartridge firing element, wherein the trigger assembly comprises a freely pivoted lever arranged directly to displace the cartridge firing element upon the application thereto of finger pressure.

It has been recognised by the present inventor that the firing element of at least certain commercially available air cartridges can be displaced in the proper manner to "fire" the weapon without the impulse of a cocked and

then released trigger assembly. It has been unexpectedly found that the simple application of pressure will suffice and that a freely pivoted trigger lever can be provided with one end engageable with the cartridge firing element and the other end fashioned for finger engagement. Use of the present invention enables an air gun to be produced which contains a minimum of moving parts. In the particular application to an air gun which is of disguised appearance, the ability to use a simple pivoted trigger lever is especially important since it is the trigger assembly which is often the most difficult part of the weapon to disguise.

The invention will now be described by way of example with reference to the accompanying drawings in which:

Figure 1 is a side view of a disguised air rifle according to this invention,

Figure 2 is a view in longitudinal section of part of the air rifle shown in Figure 1,

Figure 3 is a detailed view to an increased scale in the direction A of Figure 1,

Figure 4 is a plan view of the trigger lever of the air rifle shown in the preceding Figures,

Figure 5 is a sectional view of a known air cartridge, and

Figure 6 is a sectional view similar to Figure 5, illustrating a further embodiment of this invention.

Referring to Figure 1, there is shown a disguised air rifle taking the appearance of a walking cane. The rifle breech 10 is machined from brass and takes the external appearance of a ferrule. It carries a carved wooden handle 12 which may for example be of walnut. The outer barrel 14 of the rifle is formed of steel pipe with an exterior veneer 16 of, for example, oak. A protective bung 18 serving also as the cane tip, is a push-fit into the opening of the outer barrel 14 and may for example be formed of hard rubber.

Referring more particularly to Figure 2, the outer barrel carries at its inner end an outwardly threaded ferrule 20 which is a force fit upon the outer barrel. This ferrule 20 is in screw-thread engagement with a threaded cavity 22 in the breech. The barrel veneer 16 is arranged to stop short of the inner end of the breech to accommodate a washer 24.

There is contained within the outer barrel 14, an inner barrel 26 of hard brass tubing. The inner barrel extends over approximately two-thirds of the length of the outer barrel and is held in spaced concentric relationship with the outer barrel by one or more collars 28. Each collar is formed of wrapped fibre tape which is bonded with a suitable adhesive to both the inner and outer barrels. The inward end of the inner barrel 26 is swaged as shown at 30 to receive the end of an air cartridge 32. The remainder of the air cartridge is located in a cartridge chamber 34 formed within the outer barrel between the

breech and the swaged end of the inner barrel.

The inner barrel is provided with the rifling pattern of choice. The inner and outer barrel construction combines the advantages of corrosion resistance and machinability of brass with the strength of steel.

The breech 10 is generally hexagonal in section and tapers to a circular section of the same outer diameter as the washer 24. The opposite end of the breech carries an integral threaded stud 36 upon which is screw-mounted the handle 12. A recess 88 is bored in the breech and extends coaxially through the stud 86. At one point on the periphery of the breech, a narrow longitudinal slot 40 is cut, this slot opening into the recess 38 but stopping short of the cavity 22 which receives the threaded ferrule 20 of the outer barrel. There is positioned within this slot 40 a straight trigger lever 42 which is formed of square section brass. The trigger lever 42 is pivotally mounted with respect to the breech by means of a pin 44 extending through aligned blind apertures 46 in the breech, one each side of the slot. In the closed position, shown in full lines in Figure 2, the trigger lever 42 fully occupies the slot 40 with the outer surface of the trigger lever being contiguous with the outer surface of the breech.

At a location towards the cavity 22 and in the bottom of the slot 40, the breech is formed with a short radial bore 48. The inward end of this bore communicates with an inclined channel 50 which extends from a central location within the cavity 22 to an off-axis location within the recess 38. The bore 48 contains a small cylindrical magnet 51 which is locked in position through adhesive. The opposing surface of the trigger lever 42 contains a blind bore 52 of similar dimensions containing a further magnet 54. In this way, the trigger lever is normally held in the position shown in full lines in Figure 2. The magnet 51 serves the useful additional function of restraining the firing pin 56 against accidental dislodgement.

There is positioned within the inclined channel 50 a firing pin 56 which is formed of steel with a radius at each end. The dimensions of the firing pin are such that the inward end of the firing pin engages with the firing element of the air cartridge.

Referring now to Figure 5, there is shown a known air cartridge. For the exercise of this invention it is presently preferred to use the SAC Servo Air Cartridge as manufactured and sold by Messrs. Saxby & Palmer. The internal features of the cartridge form no part of the present invention but, put briefly, the cartridge is seen to comprise a housing 100 defining a chamber 102. Through charge/discharge port 104 and normally closed valve 106, the chamber 102 can be charged with compressed air under high pressure. At the oppo-

site end of the cartridge, there is provided a firing element 108. Inward movement of the firing element (which movement need not be impulsive) causes the valve 106 to open.

The manner of operation of the described air rifle can now be understood.

It will be appreciated that the application of sufficient pressure to the end of the trigger lever 42 adjacent the handle will overcome the force of magnets 51 and 54 causing the trigger lever to move to the firing position shown in dotted outline in Figure 2. In this position, the inner end of the trigger lever is accommodated within recess 38 of the breech. If finger pressure is now applied in the rearward direction to the outer end of the trigger lever, the firing pin 56 will be caused to move along the channel 50 into engagement with the firing element 108 of the air cartridge, displacing the same and causing the pellet to be ejected from the cartridge. The force applied through the trigger lever is of course considerably in excess of the restraining force applied to the firing pin by magnet 51.

A further embodiment of this invention is shown in Figure 6. In this Figure, parts which correspond with Figure 2 share the same reference numerals. In this embodiment, the trigger lever 42 carries a detent mechanism 110 in the end adjacent the handle. This detent mechanism comprises a ball 112 trapped within a cavity 114 and biased through a compression spring to a position in which it projects from the cavity. The breech 10 is formed in two parts with the stud 36 comprising a separate member screw-threaded into the recess 38. This enables adjustment of the stud 36 during assembly to a position in which the detent mechanism is effective to hold the trigger lever normally in the closed position whilst enabling ready displacement to the firing position.

Because there are in this embodiment no magnets which can serve also to restrain the firing pin 56, this is formed with a key-way 116 engageable with a fixed key 118 in the breech. In this way, travel of the firing pin is limited to that amount necessary to actuate the cartridge.

It should be understood that this invention has been described by way of examples only and a large number of modifications are possible without departing from the scope of the invention. Whilst the example has been chosen of an air rifle disguised as a walking cane, other forms of disguised guns can be produced or air rifles or air pistols which are of more conventional appearance. The provision of a trigger which is normally held in a closed, non-firing position is a feature which is of particular importance in disguised guns but also offers in more conventional designs a degree of safety.

CLAIMS

1. A low muzzle energy air gun, comprising a cartridge chamber for receiving a pre-loaded cartridge with a projectile, a compressed air charge and a firing element displaceable to initiate expulsion of the projectile under the action of the expanding air; a projectile bore communicating with the cartridge chamber and a trigger assembly actuatable to displace the cartridge firing element, wherein the trigger assembly comprises a freely pivoted lever arranged to displace the cartridge firing element upon the application thereto of finger pressure.
2. An air gun according to claim 1, wherein said lever is pivotable in one sense to displace the cartridge firing element and is pivotable in the opposite sense to a transport position.
3. An air gun according to claim 2, wherein locking means are provided for holding said lever in the transport position.
4. An air gun according to claim 3, wherein said locking means comprises magnetic means.
5. An air gun according to claim 3, wherein said locking means comprises a spring-biased detent.
6. An air gun according to any one of the preceding claims, wherein there is provided a firing pin mounted for limited longitudinal displacement and communicating between said lever and the cartridge firing element.
7. An air gun according to any one of the preceding claims, fashioned in the nature of a walking cane.
8. An air gun substantially as hereinbefore described with reference to and as shown in Figures 2, 3 and 4 or Figure 6 of the accompanying drawings.